

National 5

Homework RE6

1. Solve each of these quadratic equations by factorisation.

(a) $x^2 - 4x + 3 = 0$

(b) $6x - x^2 = 0$

(c) $3x^2 - 2x = 0$

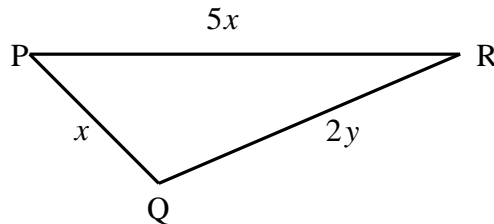
(d) $x^2 + x - 6 = 0$

(e) $2x^2 - 3x + 1 = 0$

(f) $3x^2 + 2x - 1 = 0$

2. The angles of a triangle are $2x^\circ$, $3x^\circ$ and $4x + 9^\circ$.
Find the value of x and hence the size of each angle.

3. In triangle PQR, $PQ = x$ centimetres, $PR = 5x$ centimetres and $QR = 2y$ centimetres.



- (a) The perimeter of the triangle is 42 centimetres. Write down an equation in x and y .
(b) PR is 2 centimetres longer than QR . Write down another equation in x and y .
(c) Hence calculate the values of x and y .

4. Simplify:

(a) $\sqrt{75}$

(b) $\sqrt{128}$

(c) $\sqrt{200}$

(d) $\sqrt{44}$

5. Simplify:

(a) $6\sqrt{3} - 2\sqrt{3}$

(b) $\sqrt{12} + \sqrt{3}$

(c) $(2 - \sqrt{3})(2 + \sqrt{3})$

6. Express with rational denominators:

(a) $\frac{1}{\sqrt{2}}$

(b) $\frac{3}{\sqrt{5}}$

(c) $\frac{4}{\sqrt{2}}$

(d) $\frac{4}{\sqrt{3}}$

7. Simplify:

(a) $(a^3)^4$

(b) $\frac{a^2 \times a^5}{a \times a^3}$

(c) $\frac{8t^2}{2t^{1/2}}$

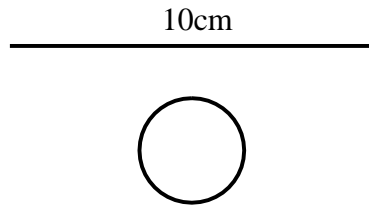
(d) $6y^5 \div 2y$

8. In a maths exam with N questions, you can score m marks for a correct answer to each of the first q questions and $m + 2$ marks for a correct answer to each of the remaining questions.

Find an expression for the maximum possible score.

9. Without a calculator find the largest power of 2 that divides $127^2 - 1^2$.
You should be thinking of a difference of squares here.

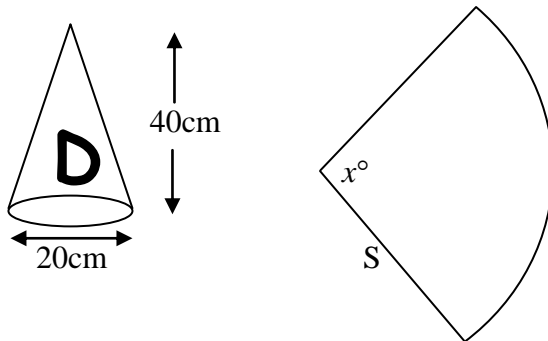
10. A piece of gold wire 10cm long is to be made into a circle.



The circumference of the circle is equal to the length of the wire.

Show that the area of the circle is exactly $\frac{25}{\pi}$ square centimetres.

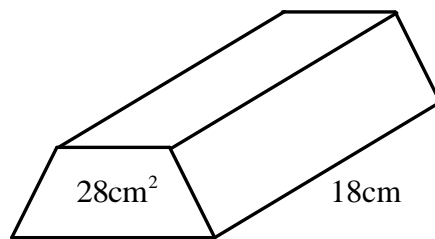
11. Robert has a dunce's hat of diameter 20cm and height 40cm. The hat is made from a sector of card, radius S , as shown.



- Find the value of S , the radius of the sector.
- Find the circumference of the base of the hat.
- Find the area of card required to make the hat.
- Find the value of x .
- Find the volume of the hat.

[For a cone, $V = \frac{1}{3}\pi r^2 h$; *Curved surface area* $= \pi r s$, where s is the slant height.]

12. (a) A block of copper 18cm long is prism-shaped, as shown below.



The area of its cross-section is 28 sq cm and its length is 18cm.
Find the volume of the block.

- The block is melted down to make a cylindrical cable of diameter 14 millimetres. Calculate the length of the cable.